

What we claim is:

- 1 1. An apparatus for prevention of oxidation of a metal object connected to an
2 electrical ground, said metal object being in an oxidizing environment,
3 comprising:
 - 4 (a) a source of DC voltage connected to the ground, said source having a first
5 voltage;
 - 6 (b) a first fastener attached to the metal object;
 - 7 (c) a second fastener attached to the metal object
 - 8 (d) a first and second capacitor each having a negative side and a positive
9 side, each negative side coupled to a fastener;
 - 10 (e) a pulse amplifier having phase compensation circuitry coupled to a
11 positive side of each capacitor, said pulse amplifier adapted to provide an
12 phase compensated amplified pulsed signal to each capacitor thereto upon
13 provision of a pulsed signal; and
 - 14 (f) a phase sensor for determining the phase of each signal at each fastener;
15 and
 - 16 (e) a microprocessor operatively coupled to the source of DC voltage and to
17 the pulse amplifier, the microprocessor providing a phase compensation
18 signal for each pulsed signal to the pulse amplifier so that each signal
19 applied to the metal object is in phase.
- 1 2. The apparatus of claim 1 further comprising a voltage monitor coupled to the

2 source of DC voltage wherein the voltage monitor provides a difference signal to
3 the microprocessor indicative of the difference between the first voltage and a
4 reference voltage wherein an LED flashes at 1/8 second when the source voltage
5 is 12 volts, flashes at 1/4 second when the source voltage is between 11.7 volt and
6 11.9 volts and flashes at 1/2 second when the source voltage is less than 11.7 volts.

1 3. The apparatus of claim 1 further comprising a high voltage protection circuit.

1 4. A method for alleviation of oxidation of a metal object in an oxidizing
2 environment comprising:
3 (a) connecting the metal object to an electrical ground;
4 (b) connecting a source of DC voltage having a first voltage to the ground;
5 (b) attaching a first fastener to the metal object;
6 (c) attaching a second fastener to the metal object;
7 (c) connecting a capacitor to each fastener;
8 (d) operatively coupling a microprocessor to the source of DC voltage and to a
9 pulse amplifier,
10 (d) using the microprocessor to provide a pulsed signal to the pulse amplifier;
11 (e) determining a phase relationship between a signal applied to the metal
12 object at the first fastener and a signal applied to the metal object at the
13 second fastener;
14 (f) adjusting the phase relationship of the signal applied to generated the first
15 and second signals applied to the metal object so that the first and second

16 applied signals are in phase when applied to the metal object; and
17 (g) providing the amplified pulses to the fastener via the capacitor.

- 1 5. The method of claim 4 further comprising:
 - 2 monitoring a source of DC voltage;
 - 3 flashing a LED at 1/8 second frequency when the source voltage is 12 volts;
 - 4 flashing the LED at ¼ second frequency when the source voltage is between 11.7
 - 5 volt and 11.9 volts;
 - 6 and flashing the LED at ½ second frequency when the source voltage is less than
 - 7 11.7 volts.

1 6. The method of claim 4 further comprising:
2 providing a high voltage protection circuit.

10 (d) a pulse amplifier coupled to the positive side of the capacitor, said pulse
11 amplifier adapted to provide a separate phase compensated amplified
12 pulsed signal thereto upon provision of a pulsed signal to each fastener;
13 and
14 (e) a microprocessor operatively coupled to the source of DC voltage and to
15 the pulse amplifier, the microprocessor providing the pulsed signal to the
16 pulse amplifier wherein each pulsed signal applied to the metal object is
17 phase compensated so that the first and second applied signals are in
18 phase.